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May 2003

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U.S. Department of Energy
Idaho Operations Office

Field Sampling Plan for V-Tanks Early Remedial Action at Waste Area Group 1, Operable Unit 1-10

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Prepared for the
U.S. Department of Energy
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Approved

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ABSTRACT

This Field Sampling Plan describes the Idaho National Engineering and Environmental Laboratory, Test Area North, Waste Area Group 1, Operable Unit 1-10 early remediation activities at the Technical Support Facility-09/18 (V-Tanks) and TSF-21 sites. The early remediation activities include: (1) defining the area of contamination and characterization of soils, and (2) V-9 isolation, system piping removals, and sand filter relocation. This Field Sampling Plan only supports the sampling of the soil to further define the area of contamination and to characterize the soil portions of the early remediation activities.

Together, this Field Sampling Plan and the *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites* constitute the sampling and analysis plan for the early remediation activities at Waste Area Group 1, Operable Unit 1-10. The Field Sampling Plan provides guidance for the site-specific investigation, including sampling, quality assurance, quality control, analytical procedures, and data management. Use of this Field Sampling Plan will help ensure that data are scientifically valid, defensible, and of known and acceptable quality. The Quality Assurance Project Plan describes project objectives and quality assurance/quality control protocols that will achieve the specified data quality objectives.

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ACRONYMS

AOC	area of contamination
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
D&D	decontamination and dismantlement
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
DOT	Department of Transportation
DQO	data quality objective
EPA	Environmental Protection Agency
ER	environmental restoration
ERA	early remediation activities
ES&H	environmental, safety, and health
ESH&Q	environment, safety, health, and quality
FFA/CO	Federal Facility Agreement and Consent Order
FR	Federal Register
FRG	final remediation goal
FSP	Field Sampling Plan
FTL	field team leader
HASP	Health and Safety Plan
HSO	health and safety officer
IEDMS	Integrated Environmental Data Management System
IET	Initial Engine Test
IH	industrial hygienist
INEEL	Idaho National Engineering and Environmental Laboratory

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INTEC	Idaho Nuclear Technology and Engineering Center
ISMS	Integrated Safety Management System
LDR	land disposal restriction
LOFT	Loss-of-Fluid Test
LTS	Long-term Stewardship
MCP	management control procedure
OMP	Occupational Medical Program
OSHA	Occupational Safety and Health Administration
OU	operable unit
PCB	polychlorinated biphenyl
PE	project engineer
PM	project manager
POD	plan of the day
PPE	personal protective equipment
PRD	program requirements document
QA	quality assurance
QA/QC	quality assurance/quality control
QAPjP	Quality Assurance Project Plan
QC	quality control
RadCon	Radiological Control
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RCT	radiological control technician
RD/RA	remedial design/remedial action
RD/RA WP	Remedial Design/Remedial Action Work Plan

RE	radiological engineer
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SAM	Sample Analysis Management
SAP	Sampling and Analysis Plan
SE	safety engineer
SH&QA	safety, health, and quality assurance
SOW	Statement of Work
SP	safety professional
STL	sampling team leader
SVOC	semivolatile organic compounds
TAN	Test Area North
TBD	to be determined
TCLP	toxicity characteristic leaching procedure
TPR	technical procedure
TSF	Technical Support Facility
UCL	upper confidence limit
UST	underground storage tank
VCO	Voluntary Consent Order
VOCs	volatile organic compounds
WAG	waste area group
WGS	Waste Generator Services

Field Sampling Plan for V-Tanks Early Remedial Action at Waste Area Group 1, Operable Unit 1-10

1. OVERVIEW

In accordance with the Federal Facility Agreement and Consent Order (FFA/CO) (U.S. Department of Energy Idaho Operations Office [DOE-ID] 1991), the U.S. Department of Energy (DOE) submits the following Field Sampling Plan (FSP) for early remediation activities (ERA) at the Idaho National Engineering and Environmental Laboratory (INEEL) Test Area North (TAN) Technical Support Facility (TSF)-09/18 (V-Tanks) and TSF-21 sites. This FSP is implemented with the latest revision of the Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites (DOE-ID 2002a). Together, this FSP and the Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites constitute the sampling and analysis plan for the ERA at Waste Area Group 1, Operable Unit 1-10, Group 2 Sites, and is a supporting document to the Comprehensive Remedial Design Remedial Action Work Plan for the Test Area North, Waste Area Group 1, Operable Unit 1-10, Group 2 Sites (RD/RAWP) (DOE-ID 2002b).

Site TSF-09 is comprised of Tanks V-1, V-2, and V-3. Site TSF-18 consists of Tank V-9 and a concrete sand filter. Site TSF-21 consisted of a valve pit that was removed in 1993; soil contamination may still be present at this site. The ERA include (1) defining the area of contamination (AOC) and characterization of soils, and (2) V-9 isolation and system piping removals.

The Quality Assurance Project Plan (QAPjP) and this FSP have been prepared in accordance with the National Oil and Hazardous Substances Contingency Plan (U.S. Environmental Protection Agency [EPA] 1990), the Guidance for Conducting Remedial Investigations and Feasibility Studies under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (EPA 1988), the FFA/CO (DOE-ID 1991), and Environmental Restoration (ER) Management Control Procedure (MCP)-9439, "Preparation of Characterization Plans." This FSP provides guidance for the Waste Area Group (WAG) 1, Operable Unit (OU) 1-10 site-specific investigation, including sampling, quality assurance (QA), quality control (QC), analytical procedures, and data management. Use of the FSP will help ensure that data are scientifically valid, defensible, and of known and acceptable quality. The QAPjP describes project objectives and quality assurance/quality control (QA/QC) protocols that will achieve the specified data quality objectives (DQOs). Use of the QAPjP will ensure that the data generated are suitable for their intended uses.

1.1 Field Sampling Plan

This FSP will guide the collection and analysis of samples that will provide data to support further definition of the AOC and characterization of soils (Section I), and potential identification of soil contamination during ERA (Section II). The ERA include:

- Isolation of Tank V-9
- System piping removals
- Sand filter relocation.

For defining the AOC (Section I), a two-phased sampling design will be employed. Phase I is a preliminary investigative effort that will be accomplished prior to subsurface soil sampling activities and will consist of surface gamma scans to locate surface and subsurface contamination for subsequent sampling during Phase II.

Phase II will consist of shallow and deep subsurface soil sampling to determine the nature and extent of contamination related to the V-Tanks. Phase II will also provide data for a hazardous waste determination and waste profile for the soils in the vicinity of the V-Tanks. These data may be used to determine contaminated soil volume estimates during RCRA closure activities in FY 2004.

For identifying contamination and waste profiling soils under the piping and sand filter relocation at the V-Tank sites (Section II), sampling will be performed on an as-needed basis. During the ERA, various pipes will be excavated and removed for disposal. If potentially contaminated areas are identified during these removals (i.e., stains and radiological contamination), soil samples will be taken and analyzed for waste characterization purposes. The piping, personal protective equipment (PPE), sampling equipment, and sand filter, which will be considered debris, will be managed in accordance with the *Waste Management Plan for V-Tanks Early Remedial Action for the Test Area North, Waste Area Group 1, Operable Unit 1-10, Group 2 Sites* (INEEL 2003a).

1.2 Project Organization and Responsibility

The organizational structure illustrated in Figure 1-1 presents an overview of the general resources and expertise required to perform the work while minimizing risks to worker health and safety.

1.2.1 Test Area North Completion Project Manager

The TAN Completion project manager has the ultimate responsibility for the technical quality of all projects, maintaining a safe environment, and the safety and health of all personnel during field activities performed by or for the TAN Completion Project (TCP). The TCP manager is responsible for the following:

- Defining scope, establishing priorities, and obtaining the funding to accomplish the project in a safe, secure, cost effective and compliant manner

- Developing the Project Execution Plan (PEP)

- Developing and maintaining integrated schedules to meet commitments, monitor progress, and to resolve priority conflicts

- Completing activities within the project's scope, schedule, and budget

- Establishing multidiscipline teams to optimize the accomplishment of work

- Insuring proper implementation of the Integrated Safety Management System (ISMS), Voluntary Protection Program (VPP), Conduct of Operations, Conduct of Maintenance, Nuclear Facility Startup/Restart, Hoisting and Rigging, Nonnuclear Safety Analysis, Nuclear Safety Analysis, and Criticality Safety.

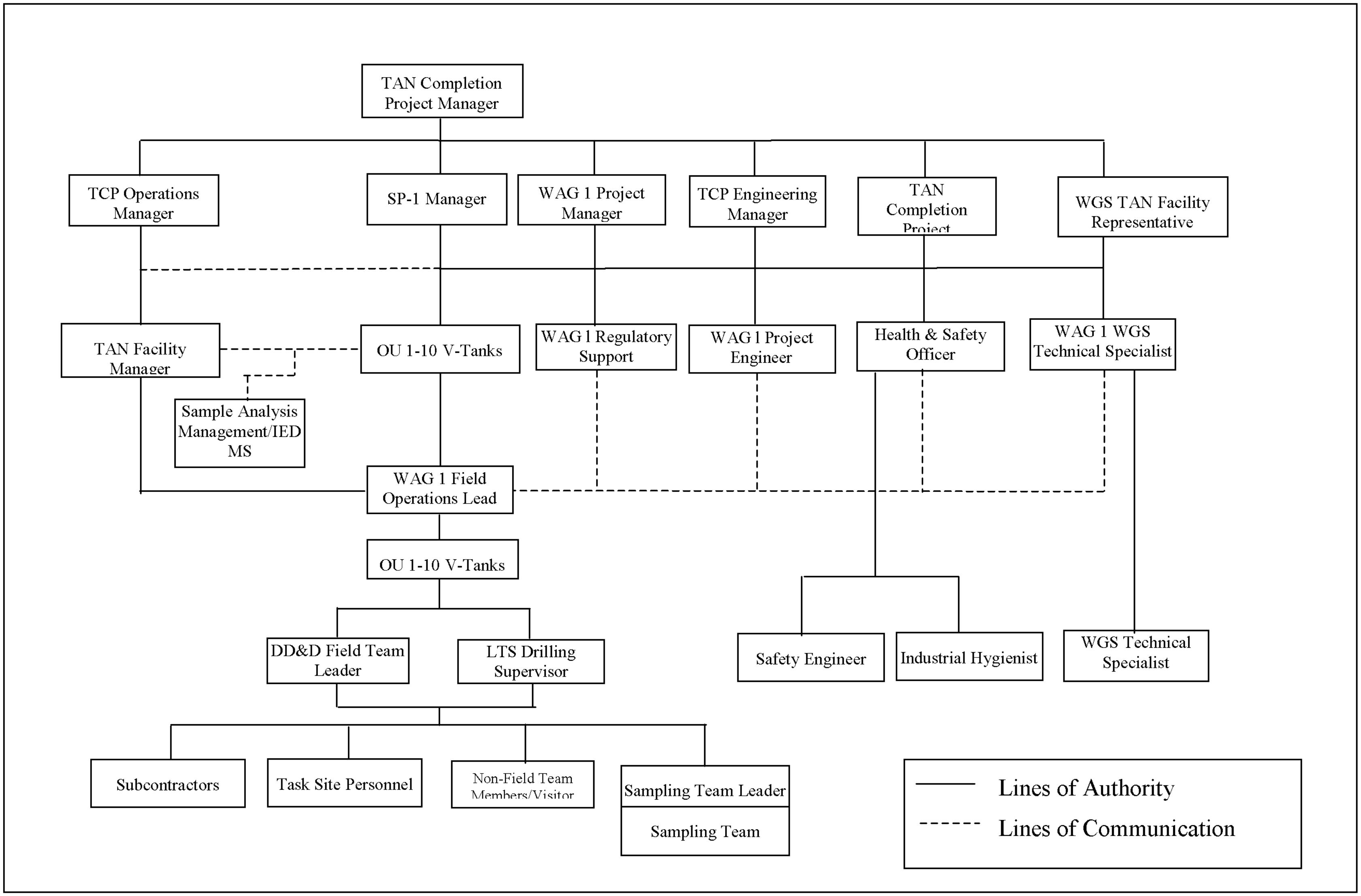

Figure 1-1. Overview of the Waste Area Group 1 organization structure.

- Ensuring the work scheduled is listed on the appropriate facility authority Plan of the Week and Plan of the Day (POD) to ensure proper work authorization activities are completed

- Ensuring the development and implementation of the appropriate interface documents

- Ensuring facilities are operated safely meeting the requirements of authorization agreements, permits, and other safety basis documents

- Ensuring project activities are performed in accordance with company policies and procedures

- Identifying (or performing the duties of) a project manager for each subproject performed within the project scope

- Maintaining a 5-year staffing plan in accordance with DOE Order 5480.19 as appropriate for the project.

1.2.2 Waste Area Group 1 Project Manager

The WAG 1 project manager (PM) or designee, such as the OU 1-10 V-Tanks PM/cost account manager (CAM), will ensure that all project activities are in compliance with the following guidelines and regulations:

- INEEL MCPs and program requirements documents (PRDs)

- Implementation of the Project Management Plan for the Idaho National Engineering and Environmental Laboratory Remediation Program (INEEL 2000a)

- The project Health and Safety Plan (HASP)

- All applicable Occupational Safety and Health Administration (OSHA), EPA, DOE, U.S. Department of Transportation (DOT), and State of Idaho requirements

- The QAPjP (DOE-ID 2002a) and this FSP.

The PM is responsible for the overall work scope, schedule, and budget, including such tasks as:

- Developing resource-loaded, time-phased control account plans based on the project technical requirements, budgets, and schedules project tasks

- Coordinating all document preparation as well as field, laboratory, and modeling activities

- Implementing the project requirements and ensuring that work is performed as planned

- Coordinating activities and document/work approval and scheduling with the facility manager.

The PM will ensure that employee job function evaluations (Form 340.02) are completed for all project employees, reviewed by the project industrial hygienist (IH) for validation, and submitted to the Occupational Medical Program (OMP) for determination of necessary medical evaluations.

Other functions and responsibilities of the PM include:

- Coordinating and interfacing with TAN deactivation, decontamination, and dismantlement (DD&D) and Voluntary Consent Order (VCO) projects.
- Ensuring project integration efficiencies are realized and combined milestones are achieved
- Developing the documentation required to support the project
- Ensuring the technical review and acceptance of all project documentation
- Developing the site-specific plans required by the ER program, such as work plans; environmental, safety, health (ES&H) plans; and sampling and analysis plans (SAPs)
- Ensuring that project activities and deliverables meet schedule and scope requirements as described in the FFA/CO, Attachment A, "Action Plan for Implementation of the Federal Facility Agreement and Consent Order" (DOE-ID 1991), and applicable guidance
- Supporting CERCLA and National Environmental Policy Act (NEPA) public review and comment processes by identifying their requirements and scheduling for their organization
- Identifying the subproject technology needs
- Coordinating and interfacing with the units within the program support organization on issues relating to QA, ES&H, and NEPA support for the project
- Coordinating site-specific data collection, review for technical adequacy, and input to an approved database, such as the Environmental Restoration Information System (ERIS)
- Coordinating and interfacing with subcontractors to ensure milestones are met, adequate management support is in place, technical scope is planned and executed appropriately, and project costs are kept within budget.

1.2.3 TAN Completion Project Subproject 1 Manager

The TCP SP-1 manager is line management and responsible for developing and managing the subproject. Responsibilities include:

- Providing information for budget approval, milestone commitments, and performance measures
- Developing and maintaining integrated schedules to meet commitments, monitor progress, and to resolve priority conflicts
- Identifying to the project director the required resources to complete subproject work according to the project plan requirements and schedule
- Managing the appropriate subproject personnel in execution of project planning and monitoring of subproject progress
- Identifying to and assisting the project director in resolving conflicts between subproject priorities
- Ensuring that operational work for the subproject is authorized by the facility authority

- Ensuring start-up activities (management self-assessment, readiness assessments, operational readiness reviews) are scheduled and completed through the appropriate facility authority

- Ensuring the desired operational activities are listed on the appropriate facility authority Plan of the Week, Plan of the Day

- Ensuring operational work for the subproject is directed through the appropriate operation director's organization to accomplish the work safely and according to regulatory and company requirements

- Establishing variance threshold for control account and project reporting

- Overseeing the preparation of the monthly project status report using variance data generated

- Overseeing the preparation of the estimate-at-completion (EAC) for both semi-annual and monthly requirements

- Approving the monthly project status report and the estimate-at-completion.

1.2.4 Operable Unit 1-10 V-Tanks Project Manager/Cost Account Manager

The OU 1-10 V-Tanks project manager is responsible for the execution of the project's technical work. This includes, but is not limited to:

- Supervising engineers to ensure that timely, cost-effective engineering and design services are performed in accordance with project orders and directives, using sound engineering practices and high technical standards

- Providing technical resource and schedule integration, establishing priorities, and identifying and requesting the resources necessary to accomplish work objectives for all assigned engineering and design activities

- Ensuring that the work performed is clear, concise, and executable by working with the customer and the PM to establish firm project/task requirements

- Developing project technical execution strategy and ensuring that cost-effective design solutions are developed in accordance with safety, environmental, and quality objectives

- Reviewing project status and variances and providing corrective actions

- Resolving conflicts regarding project requirements and project team members' comments.

In addition, the OU 1-10 V-Tanks project manager is responsible for the project's technical staffing. This will include serving as an interface between the WAG 1 project manager and the appropriate functional managers of the organizations providing the technical staff. The project engineer (PE) shall be accountable to the PM for all cost and schedule performance of the assigned technical tasks and to the functional managers for the technical quality of a project's work products.

1.2.5 Test Area North Facility Manager

The TAN facility manager reports to the TAN operations manager who reports to the TCP manager, and, therefore, must be informed of all activities performed in the area. The TAN operations manager and facility manager are responsible for the following functions and processes:

- Overseeing all work processes and work packages performed in the TAN area
- Establishing and executing a monthly, weekly, and daily operating plan for the TAN area
- Executing the Environmental, Safety, Health, and Quality (ESH&Q) program for the TAN area
- Executing the Integrated Safety Management System (ISMS) for the TAN area
- Executing Enhanced Work Planning for the TAN area
- Executing the Voluntary Protection Program (VPP) in the TAN area
- Ensuring environmental compliance within the TAN area
- Executing that portion of the voluntary compliance order that pertains to the TAN area
- Correcting the root cause functions of accident investigations in the TAN area
- Correcting the root cause functions of the Voluntary Consent Order for the TAN area.

1.2.6 Sample Analysis Management

The INEEL Sample Analysis Management (SAM) office will obtain laboratory services, as required, ensure that the generated data meet the needs of the project by validating all analytical laboratory data according to resident protocol, and ensure that data are reported to the project personnel in a timely fashion, as required by the FFA/CO.

The assigned SAM representative is responsible for:

- Generating task order statements of work (SOWs) and master task agreements
- Interfacing with the PM and/or designee during the preparation of the SAP database, as required by PRD-5030, "Environmental Requirements for Facilities, Processes, Materials, and Equipment"
- Providing guidance on the appropriate number of field QC samples required by the QAPjP (DOE-ID 2002a)
- Providing guidance on the appropriate bottle size and preservation for sample collection
- Ensuring that the sample identification numbers used by the project are unique from all others ever assigned by the Environmental Data Management System.

The preparation of the plan database, along with the completion of the SAM services request form (INEEL Form 435.26), initiates the sample and sample waste tracking activities performed by the SAM.

The SAM-contracted laboratory will have overall responsibility for laboratory technical quality, laboratory cost control, laboratory personnel management, and adherence to agreed-upon laboratory schedules. Responsibilities of the laboratory personnel include:

- Preparing analytical reports
- Ensuring completion of chain-of-custody information
- Ensuring all QA/QC procedures are implemented in accordance with SAM-generated task order SOWs and master task agreements.

1.2.7 TAN Completion Project Safety, Health, and Quality Assurance Manager

The TAN Completion Project (TCP) Safety, Health, and Quality Assurance (SH&QA) manager, or designee, reports directly to the TCP Director and is responsible for managing SH&QA resources, including:

- Ensuring that SH&QA programs, policies, standards, procedures, and mandatory requirements are planned, scheduled, implemented, and executed in the day-to-day TCP operations
- Directing SH&QA compliance in all activities by coordinating related functional entities and providing technical and administrative direction to subordinate staff.

Under the direction of the TCP Director, the TCP SH&QA manager represents the TCP directorate in all SH&QA matters and is responsible for:

- TCP SH&QA management compliance
- Oversight for all TCP CERCLA and decontamination and dismantlement (D&D) operations planned and conducted at WAG 1
- TCP INEEL-wide environmental monitoring activities.

The TCP SH&QA manager directs the management of personnel and the implementation of programs related to the following technical disciplines:

- Radiological controls (RadCon) (matrixed)
- Industrial safety
- Fire protection
- QA
- IH (matrixed)
- Emergency preparedness (matrixed).

1.2.8 Health and Safety Officer

The health and safety officer (HSO) assigned to the task site serves as the primary contact for all health and safety issues. Other ES&H professionals at the task site, including the safety professional (SP), the industrial hygienist (IH), the radiological control technician (RCT), the radiological engineer (RE), and the facility representative, support the HSO as necessary. The HSO advises the field team leader (FTL) on all aspects of health and safety and is authorized to:

- Stop work at the site if any operation threatens worker or public health and/or safety
- Verify compliance with the HASP to conduct conformance inspections and self-assessments
- Require and monitor corrective actions
- Monitor decontamination procedures, as appropriate.

Personnel assigned as the HSO or alternate HSO must be qualified (pursuant to the OSHA definition) to recognize and evaluate hazards. The HSO or alternate will be given the authority to take or direct actions to ensure that workers are protected. The HSO may also serve as the IH, SP, or in some cases the FTL, depending on the hazards, complexity, and size of the activity involved and required concurrence from the ER safety and health (S&H) compliance officer. However, any other task-site responsibilities of the HSO must not conflict (either philosophically or in terms of overly increased volume of work) with the role of the HSO at the task site.

If the HSO must leave the site, he or she will appoint an alternate as the acting HSO. The identity of the acting HSO will be recorded in the FTL logbook and communicated to task-site personnel.

NOTE: *The HSO will ensure that the appropriate SH&QA personnel participate in the development and verification of the hazards screening profile checklist in accordance with Standard (STD) -101, "Integrated Work Control Process," or MCP-3562, "Hazard Identification, Analysis and Control of Operational Activities."*

1.2.9 Waste Generator Services Test Area North Facility Representative and Waste Technical Specialist

Waste Generator Services (WGS) provides INEEL onsite and offsite waste generators with turn-key professional waste management services to disposition legacy and newly generated waste in a compliant, timely, and cost-effective manner, and to ensure all treatment/storage/disposal waste acceptance criteria and other requirements are met. Waste Generator Services is responsible for:

- Facility Representative–Collaborating to complete initial evaluation of process knowledge and assign a probable waste type.
- WAG 1 WGS Technical Specialist–Coordinating with the WAG 1 OU 1-10 projects to determine waste generation issues and develop the project's Waste Management Plan. Work with the Tan Facility Representative and the TAN Waste Technical Specialist in directing the management of wastes generated by the projects.
- Waste Technical Specialist–Assuming cradle-to-grave responsibilities for a given waste stream and ensuring that all the activities in this process are completed.

1.2.10 Field Operations Manager

The field operations manager (FOM) represents the OU 1-10 organization at project site(s) with delegated responsibility for the safe and successful completion of all OU 1-10 project tasks (this statement does not detract nor relieve the facility manager of his responsibilities for safe conduct of activities in the facility). The FOM will manage tasks and ensure that the applicable field sampling plans, technical procedures, and other project-specific documents are executed properly. The FOM will report project status on a regular basis to the project manager. Additional responsibilities include but are not limited to the following:

- Ensuring that all field activities are conducted in compliance with technical procedures, work orders, and associated ISMS requirements

- Ensuring field team personnel comply with TCP project facility and operations requirements (as applicable)

- Obtaining and coordinating all resources needed to implement the fieldwork, including equipment, labor, and administrative and technical permits and approvals.

1.2.11 Operable Unit 1-10 V-Tanks Field Operations Coordinator

The field operations coordinator serves as the point of contact for coordination between project management and work organizations for all work completed in the V-Tank area. Additional responsibilities include but are not limited to the following:

- Ensuring compliance/implementation of project specific field operations, procedures, and requirements

- Ensuring that field activities are performed in accordance with the design and environmental regulatory SH&QA standards

- Ensuring proper work control documentation is in place and appropriate training is completed before the start of any field operations

- Ensuring that all field activities are conducted in compliance with ISMS requirements and associated work orders or procedures

- Coordinating all activities with the appropriate work groups, facilities, and project managers

- Coordinating all resources needed to implement the V-Tank area fieldwork including equipment, labor, and administrative/technical permits and approvals

- Monitoring and providing oversight for project field activities in accordance with established cost and schedule.

1.2.12 Decontamination and Dismantlement Field Team Lead

The D&D field team leader (FTL) has ultimate responsibility for the safe and successful completion of activities associated with OU 1-10 V-Tank project piping isolation and equipment removal. All health and safety issues at the V-Tank site for this work must be brought to the FTL's attention. In addition to managing field operations, executing the FSP as applicable, enforcing site control, documenting work site activities, and conducting daily safety briefings, the FTL's responsibilities include but are not limited to the following:

- Enforcing task-site control, document activities, and conducting project-specific plan-of-the-day and daily safety briefings at the start of each shift

- Completing briefings and reviews in accordance with the requirements outlined in MCP-3003, "Performing Pre-Job Briefings and Post-Job Reviews." The FTL will complete the job requirements checklist in accordance with STD-101, "Integrated Work Control Process."

- Managing emergency and accident response and coordination

- Conducting ESH&QA inspections
- Ensuring compliance with waste management requirements and coordinating such activities with the environmental compliance coordinator or designee.

1.2.13 Long-term Stewardship Drilling Supervisor

The Long-term Stewardship (LTS) drilling supervisor is responsible for the coordination and technical implementation of all drilling and well-services projects. The drilling supervisor's responsibilities include but are not limited to:

- Ensuring work control documents are initiated and approved to support the schedule
- Ensuring work performed in the field is in accordance with contractual requirements and properly documenting field changes
- Ensuring subcontractor and project is in compliance with all safety and environmental regulations
- Inspecting all heavy equipment, materials, and supplies before use on the INEEL
- Performing daily, weekly, and monthly inspections of subcontractor job sites, material lay-down, and storage areas
- Documenting inspections for trending and tracking purposes
- Ensuring work scope is approved on the appropriate facility plan-of-the-week schedule
- Coordinating support organization resources (e.g., radiological control technician, industrial hygiene, construction safety, and quality assurance)
- Monitoring subcontractor work and approving progress payment requests
- Coordinating subcontractor labor and other support labor, as needed
- Ensuring all chemicals are approved and entered into the chemical inventory system before transporting them on-Site
- Ensuring all construction waste is managed in accordance with each job-specific waste management plan.

1.2.14 Drilling Subcontractor

The drilling subcontractor will have a lead driller or foreman that serves as the single point of contact for all subcontractor safety issues at the site. The subcontractor lead driller will supervise subcontractor personnel assigned to work at the site and report to the LTS drilling supervisor on all field interface issues. The driller lead will work with the LTS drilling supervisor and field operations coordinator to accomplish day-to-day drilling operations at the site and identify and obtain additional resources needed at the site. The drilling subcontractor lead will report any health and safety issues that arise at the site to the LTS drilling supervisor and field operations coordinator and/or the HSO, and may stop work at the site if an unsafe condition exists. The subcontractor lead will also be asked to provide hazard and mitigation information regarding the nature of the drilling tasks during the POD meeting and participate in job-site hazard walk-downs.

1.2.15 Task-Site Personnel

All task-site personnel shall understand and comply with the requirements of the project HASP. At the start of each shift, the FTL or HSO will conduct a planning meeting to discuss all daily tasks, associated hazards, hazard mitigation (e.g., engineering and administrative controls, required PPE, and work control documents), and emergency conditions and actions. During POD and pre-job briefings, the project HSO, the IH, and the RCT will provide input, as deemed appropriate, to clarify health and safety requirements for the tasks. All personnel will be encouraged to ask questions regarding site tasks and to provide suggestions for performing required tasks in a more safe and effective manner in response to lessons learned from the previous day's activities.

Once at the site, all personnel are responsible for identifying any potentially unsafe situations or conditions to the FTL or HSO for corrective action. If an unsafe condition is perceived to pose an imminent danger, site personnel are authorized to stop work immediately and notify the FTL or HSO of the unsafe condition.

1.2.16 Nonfield Team Members/Visitors

All persons on the site who are not part of the field team (e.g., surveyor, equipment operator, or other craft personnel not assigned to the project) are considered nonfield team members or visitors for the purposes of this project. A person shall be considered "onsite" when that individual is present in or beyond the designated support zone. In accordance with 29 Code of Federal Regulations (CFR) 1910.120/1926.65, nonfield team members are considered occasional site workers and must:

- Check in with the facility shift supervisor in TAN-607
- Receive any additional site-specific training identified in Section 6 of the HASP before entering beyond the support zone of the project site
- Meet all required training based on the tasks taking place, as identified in Section 4
- Meet minimum training requirements for such workers as described in the OSHA standard
- Meet the same training requirements as the workers, if the nonworkers' tasks require entry into the work control zone.

Training must be documented, and a copy of the documentation must be incorporated into the project field file. A site supervisor (e.g., HSO or FTL) shall supervise all nonfield team personnel who have not completed their three days of supervised field experience in accordance with the Hazardous Waste Operations (HAZWOPER) standard.

1.2.17 Sampling Team Leader

The sampling team leader (STL) reports to the FTL and has ultimate responsibility for the safe and successful completion of assigned project tasks, including:

- Overseeing the sample team
- Ensuring that the samples are collected from appropriate locations
- Ensuring that proper sampling methods are employed, chain-of-custody procedures are followed, and shipping requirements are met.

If the STL leaves the task site, an alternate will be appointed to act in his capacity. Acting STLs on the task site must meet all the same training requirements as the FTL, as outlined in Section 6 of the project HASP. The identity of the acting STL shall be conveyed to task site personnel, recorded in the Sample Logbook, and communicated to the FTL, and LTS drilling supervisor, or designee, when appropriate.

1.2.18 Sampling Team

The sampling team will consist of a minimum of two members, who will perform the onsite tasks necessary to collect the samples. The buddy system will be implemented for all tasks, and no team member will enter the contamination area alone. The members of the sampling team will be led by an STL who may also serve as the project FTL. The IH and RCT will support the sampling team as warranted, in response to site-specific hazards and task evolutions.

1.2.19 Safety Engineer

The safety engineer (SE) is responsible for:

- Reviewing work packages and observing work-site activity
- Assessing compliance with the INEEL Manual 14B–Safety and Health
- Signing Safe Work Permits (SWPs)
- Advising the FTL on required safety equipment
- Answering questions on safety issues and concerns
- Recommending solutions to safety issues and concerns that arise at the work site.

The SE may conduct periodic inspections in accordance with MCP-3449, "Safety and Health Inspections," and have other duties at the work site as specified in other sections of the project HASP. Copies of the SE's inspections will be kept in the project field file.

1.2.20 Industrial Hygienist

The IH is the primary source of information regarding nonradiological hazardous and toxic agents at the work site. During any work operations involving either existing or anticipated chemical hazards to operations personnel, the IH will be present at the task site. Along with any additional duties at the task site specified in other sections of the project HASP or company procedures and manuals, the IH is responsible for:

- Assessing the potential for worker exposures to hazardous agents in accordance with INEEL procedures and the INEEL Manual 14B–Safety and Health
- Assessing and recommending appropriate hazard controls for protection of work site personnel
- Reviewing the effectiveness of monitoring and PPE required in the project HASP and recommending changes as appropriate.

NOTE: *The IH will review all employee job function evaluations (Form 340.02) to validate management completion of the form. After validation, the form will be sent to the OMP for the scheduling of a medical evaluation, as needed.*

Following an evacuation, the IH will assist in determining whether conditions at the task site are safe for reentry. The IH, the HSO, and/or personnel supervisors will refer any personnel showing health effects resulting from possible exposure to hazardous agents to the OMP. During emergencies involving hazardous material, members of the Emergency Response Organization (ERO) will perform IH measurements.

1.3 Points of Contact

Table 1-1 lists the key points of contact for the WAG 1, OU 1-10 V-Tank field activities.

Table 1-1. Points of contact.

Name	Title	Telephone Number
Doug Wale	Facility Manager	(208) 526-1102
Kevin Streeper	Nuclear Facility Manager	(208) 526-6151
Lisa Wolford	TAN 607 Facilities Sub Project Manager	(208) 526-3050
Charlie Chebul	TAN Clean Closure ESH&QA Manager	(208) 526-9566
Allen Jantz	WAG 1 Project Manager	(208) 526-8517
Jim Jessmore	OU 1-10 ERA Group 2 Project Manager	(208) 526-7558
Gary McDannel	WAG 1 Project Engineer	(208) 526-5076
Donna Nicklaus	TAN-616 D&D/VCO Project Manager	(208) 526-5683
Marshall Marlor	WGS Facility Representative	(208) 5262581
John Harris	WGS WAG 1 Waste Technical Specialist	(208) 526-3461
Todd Lewis	Health and Safety Officer Industrial Hygienist Safety Engineer	(208) 526-6856
Eric Gosswiller	Fire Protection Engineer	(208) 526-8896
TBD	Radiological Control Technician	TBD
Rick Sorensen	RADCON/Radiological Engineer	(208) 526-9747
Jim Rider	QA Engineer	(208) 526-9618
Donna Kirchner	Sample Analysis Management	(208) 526-9873
TBD	IEDMS Technical Leader	TBD
Mark Elliot	Field Operations Manager	(208) 526-0872
Paul Sloan	Field Team Leader	(208) 526-6199
Jim Clayton	D&D Field Team Leader	(208) 526-2698

TBD = To be determined.

2. WORK SITE BACKGROUND

This section provides an overview of the history, location, and previous activities at the work site. Data results from previous investigation are presented to characterize site conditions for additional characterization activities addressed by this plan.

2.1 Work Site Description and Background

2.1.1 Description and Historical Background

The INEEL is a U.S. government-owned test site, managed by the DOE, and located in southeastern Idaho, 51.5 km (32 mi) west of Idaho Falls, as shown in Figure 2-1. The laboratory encompasses approximately 2,305 km2 (890 mi2) of the northeastern portion of the Eastern Snake River Plain. The Eastern Snake River Plain is a relatively flat, semiarid sagebrush desert with predominant relief manifested either as volcanic buttes jutting up from the desert floor or as unevenly surfaced basalt flows or flow vents and fissures (DOE-ID 1999). Elevations on the INEEL site range from 2,003 m (6,572 ft) in the southeast to 1,448 m (4,750 ft) in the central lowlands with an average elevation of 1,516 m (4,975 ft). Drainage within and around the plain recharges the Snake River Plain Aquifer, which flows beneath the INEEL and the surrounding area (DOE-ID 1997). The top of the aquifer slopes from about 61 m (200 ft) below the surface at TAN to about 183 m (600 ft) below the surface at the Radioactive Waste Management Complex (RWMC). The aquifer is overlain by lava flows and sediment (DOE-ID 1999).

The U.S. Atomic Energy Commission initially established the facility in 1949 as the National Reactor Testing Station for nuclear energy research and related activities. In 1952, the facility was expanded to accept shipments of transuranic radionuclides and low-level waste. It was named the Idaho National Engineering Laboratory in 1974. In 1997, the Site was renamed the INEEL to reflect its expanded mission to include a broader range of engineering and environmental management activities. Currently, the INEEL is primarily used for nuclear research and development and waste management (DOE-ID 1999).

In November 1989, the EPA placed the INEEL on the *National Priorities List of the National Oil and Hazardous Substances Pollution Contingency Plan* (54 Federal Register [FR] 48184) because of confirmed contaminant releases to the environment. In response to this listing, the Agencies, composed of the DOE, EPA, and the Idaho Department of Environmental Quality, negotiated an FFA/CO and action plan. The FFA/CO and action plan were signed in 1991 by the Agencies, thereby establishing the procedural framework and schedule for developing, prioritizing, implementing, and monitoring response actions at the INEEL in accordance with CERCLA, Resource Conservation and Recovery Act (RCRA), and the Idaho Hazardous Waste Management Act (DOE-ID 1991).

To better manage cleanup activities, the INEEL was divided into 10 waste area groups (WAGs). TAN is designated as WAG 1, which includes the TSF, the Initial Engine Test (IET) Facility, the Loss-of-Fluid Test (LOFT) Facility, the Specific Manufacturing Capability Facility, the Water Reactor Research Test Facility fenced areas, and the immediate areas outside the fence lines (DOE-ID 1999).

Located in the north-central portion of the INEEL, as shown in Figures 2-1 and 2-2, TAN was constructed between 1954 and 1961 to support the Aircraft Nuclear Propulsion Program, which developed and tested designs for nuclear-powered aircraft engines until the research was terminated by Congress in 1961. The area's facilities were then converted to support a variety of other DOE research projects. From 1962 through 1986, the area was principally devoted to the LOFT Facility, which was used to perform reactor safety testing and studies. Beginning in 1980, the area was used to conduct research and development with material from the 1979 Three-Mile Island reactor accident (DOE-ID 1997).

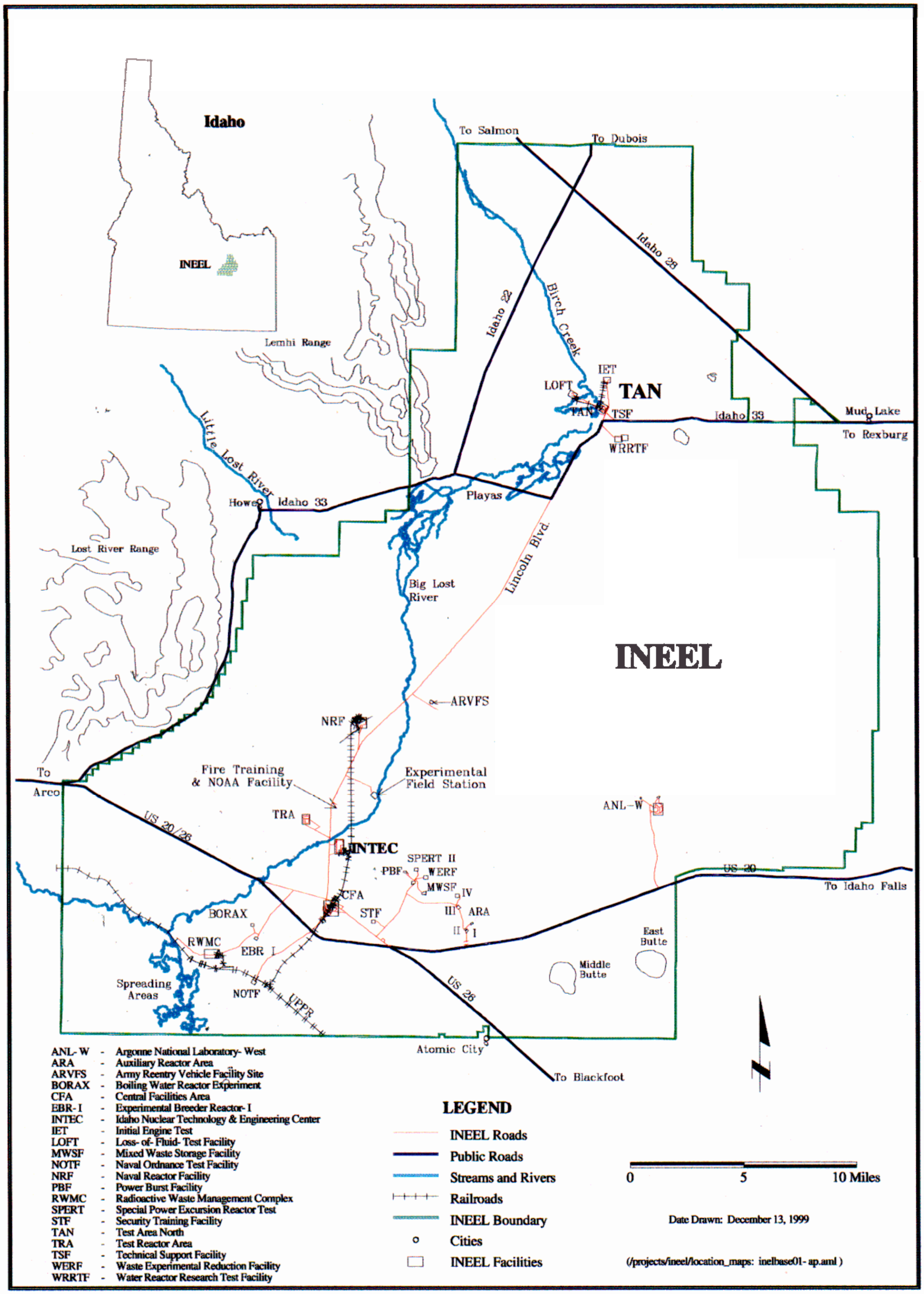

Figure 2-1. Map showing the location of Test Area North at the Idaho National Engineering and Environmental Laboratory.

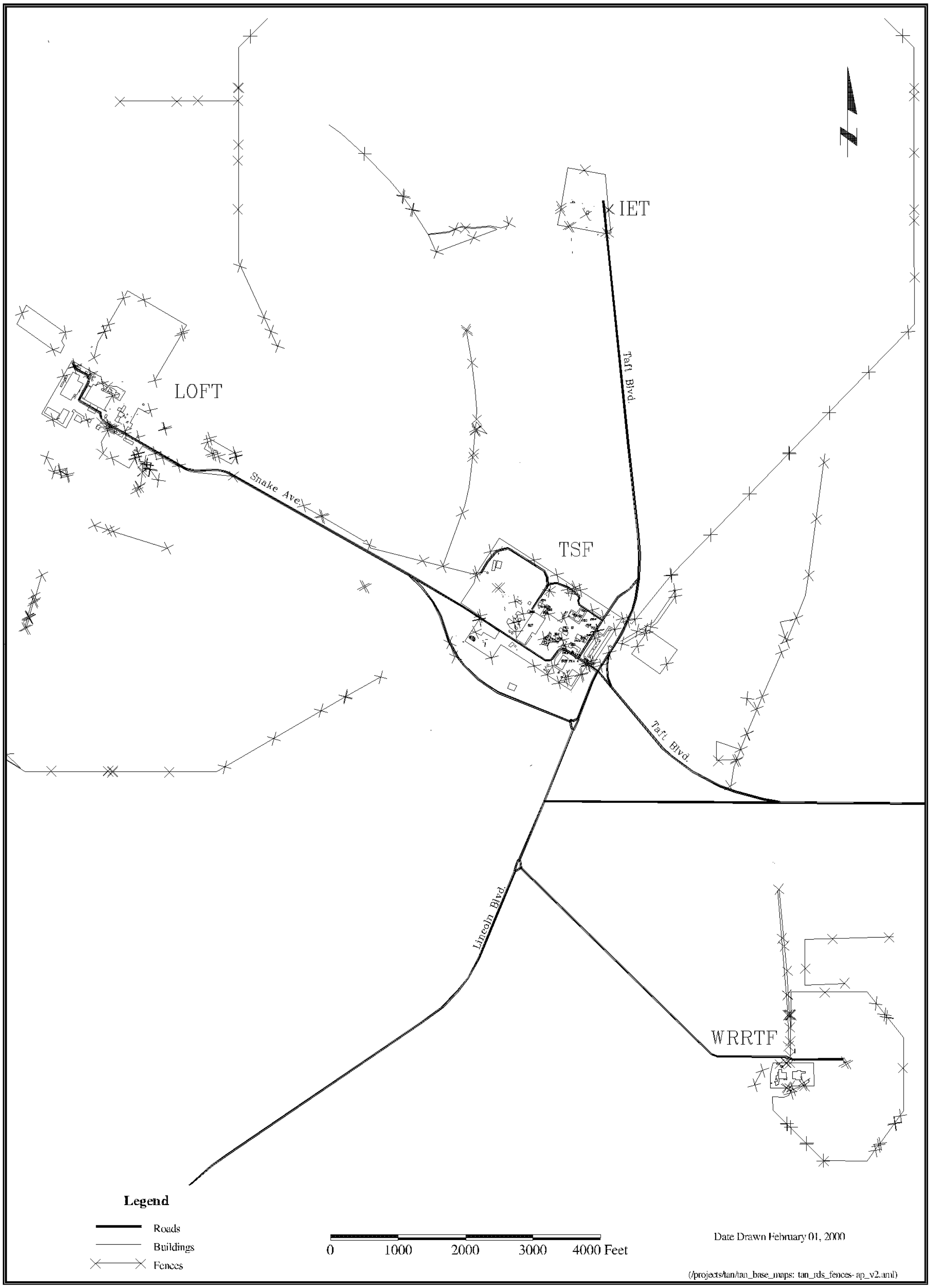

Figure 2-2. Map showing the Test Area North facilities.

During the mid-1980s, the TAN Hot Shop (DOE-ID 1999) supported the final tests for the LOFT program. Current activities include the manufacture of armor for military vehicles at the Specific Manufacturing Capability Facility and nuclear inspection and storage operations at TSF. The IET Facility has been deactivated, decontaminated, and decommissioned by the INEEL Deactivation, Decontamination, and Decommissioning program.

In 1991, the FFA/CO established 10 operable units (OUs) within WAG 1, consisting of 94 potential release sites (DOE-ID 1997). The sites include various types of pits, numerous spills, ponds, aboveground and underground storage tanks (USTs), and a railroad turntable. A comprehensive remedial investigation/feasibility study (RI/FS) was initiated in 1995 to determine the nature and extent of the contamination at TAN. The FFA/CO defines OU 1-10 as the comprehensive WAG 1 RI/FS (DOE-ID 1997), which culminated with the OU 1-10 Record of Decision (ROD). Final remediation goals (FRGs) were established in the ROD based on long-term risks associated with Cs-137 activity. The following subsections describe the sampling events that have taken place at sites TSF-09, TSF-18, and TSF-21 before, during, and after the ROD was established.

2.1.2 Technical Support Facility-09, Tanks V-1, V-2, and V-3

The TSF Intermediate-Level (Radioactive) Waste Disposal System (TSF-09) is situated in an open area east of TAN-616 and north of TAN-607, as shown on Figures 2-3 and 2-4. TSF-09 consists of three USTs (V-1, V-2, and V-3). These USTs are constructed of stainless steel, 3 m (10 ft) in diameter, 5.5 m (18 ft) long, buried approximately 3 m (10 ft) below grade, and have 50.8-cm (20-in.) manholes that are accessible through 1.8-m (6-ft) diameter culverts installed in 1981. These V-Tanks were installed in the early 1950s as part of the system designed to collect the following for treatment:

1. Radioactive liquid effluents generated in the hot cells, laboratories, and decontamination facilities at TAN

2. Waste from the IET Facility.

Based on environmental sampling, process knowledge, and work site use, the RI/FS concluded that the known or suspected types of contamination at the work sites include metals (barium, cadmium, chromium, lead, mercury, and silver), volatile organic compounds ([VOCs] trichloroethene, 1,1,1-trichloroethane), semivolatile organic compounds ([SVOCs] Bis(2-ethylhexyl)phthalate), polychlorinated biphenyls (PCBs), radionuclides (Cs-137, Co-60, Sr-90, and various isotopes of plutonium and uranium [DOE-ID 1997]). Since their installation, the three 37,850-L (10,000-gal) tanks have been used to store radioactive liquid wastes generated at TAN. Although the waste sent to the tanks was considered liquid, some oils and solids were also sent to the tanks, thereby creating two distinct phases (sludge and water). A Chemical Characterization report[a] (DOE-ID 2002b, Appendix C) documents potential organic and inorganic contaminants for TSF-09. For Tanks V-1 through V-3, Table B-1 in Appendix B summarizes the potential contaminants in two separate phases within each tank.

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a. The report also clarifies that several VOC and SVOC constituents were not detected in the waste; however, detection limits exceeded either regulatory limits and/or applicable LDR treatment standards. In this case, these constituents could not conclusively be eliminated as not being present in the waste. Therefore, this characterization has assumed these constituents to be present in the waste at the detection limit value or concentration.

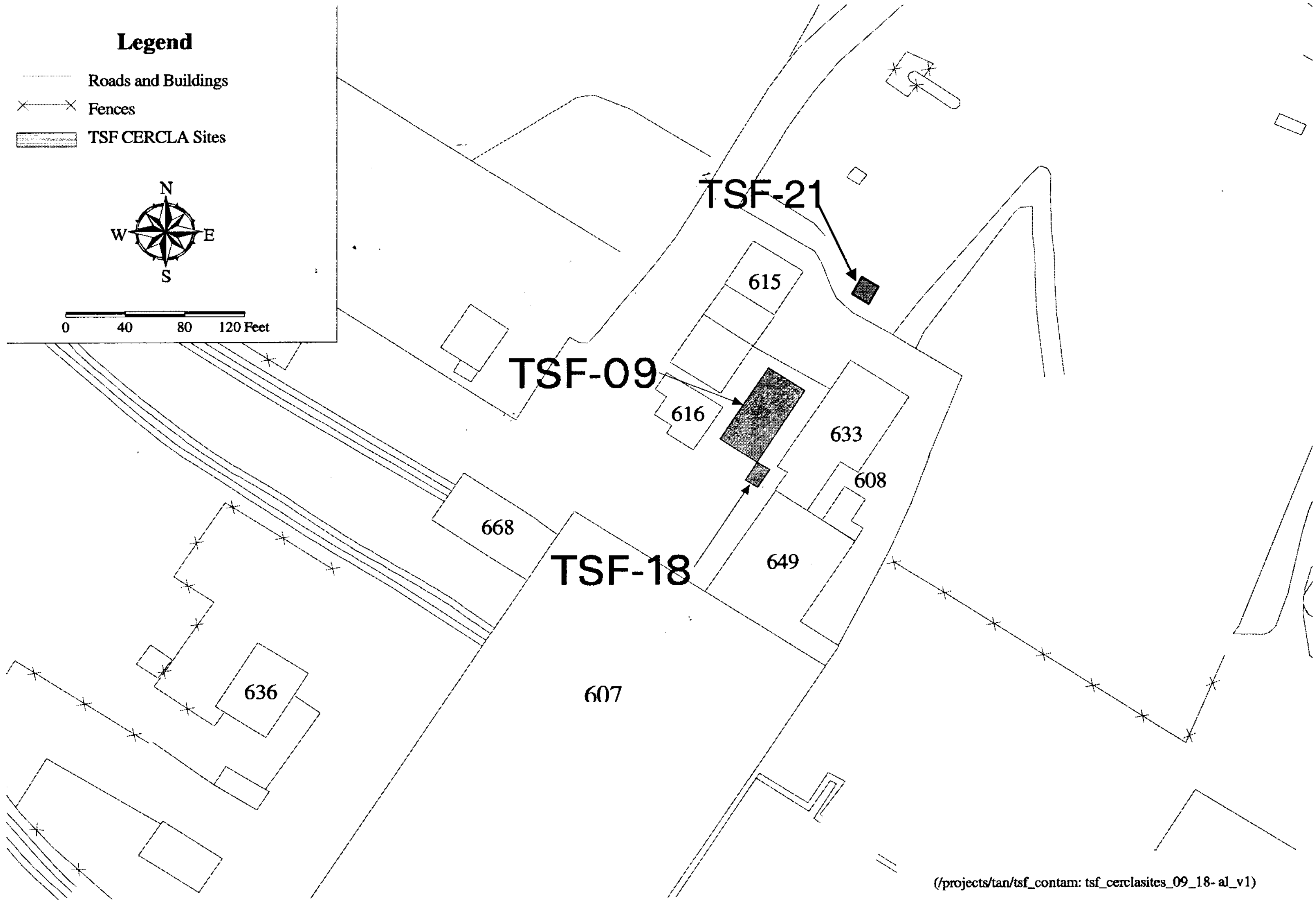

Figure 2-3. Locations of sites TSF-09, TSF-18, and TSF-21.

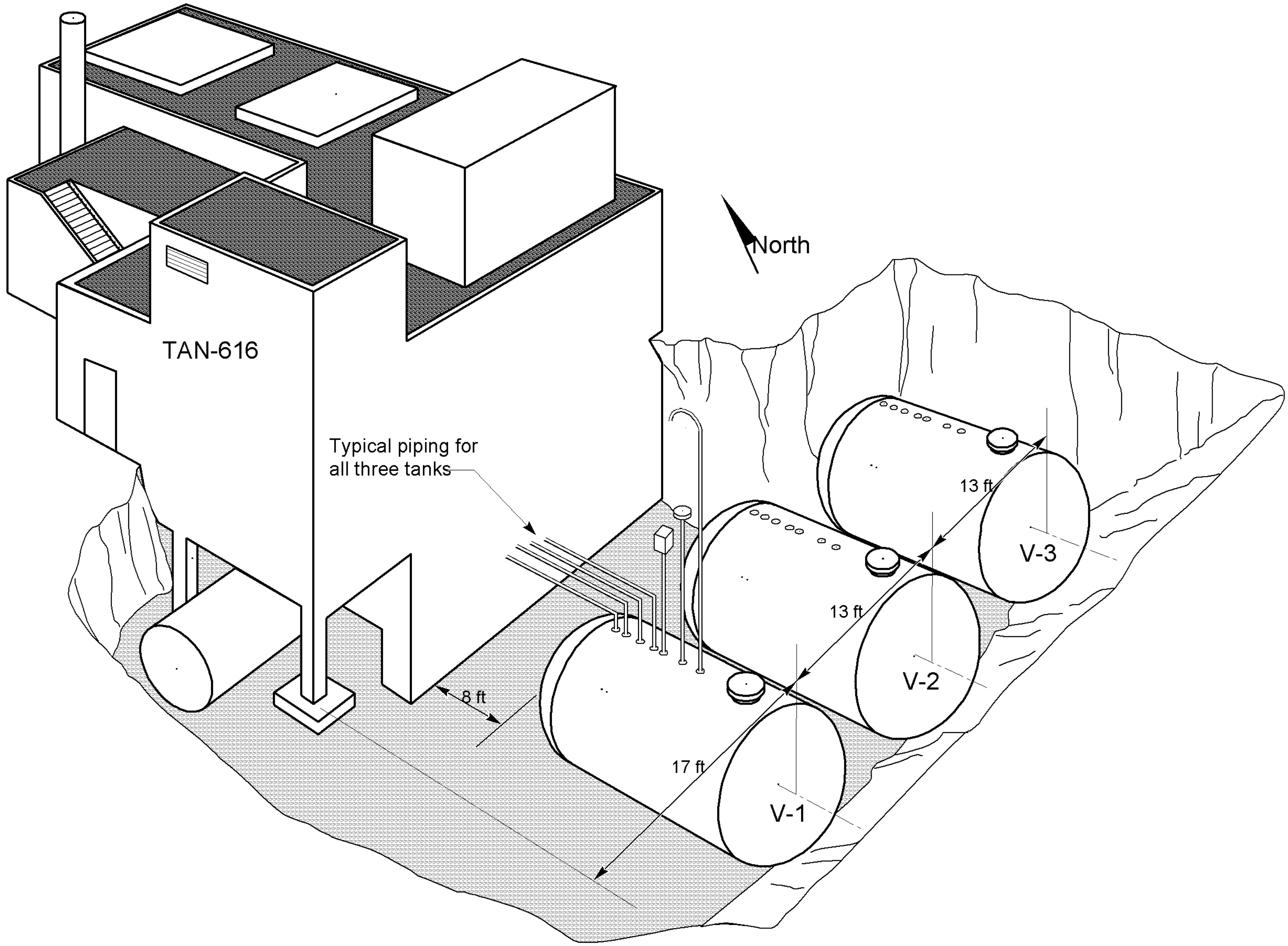

Figure 2-4. Diagram of tanks V-1, V-2, and V-3.

The waste collected in the tanks was treated in the evaporator system located in TAN-616. Treatment residues were sent to the TSF injection well or the PM-2A tanks at TSF-26. After the evaporator system in TAN-616 was shut down in 1972, waste stored in the TSF-09 tanks was sent directly to the PM-2A tanks. After 1975, waste that had accumulated in the TSF-09 tanks was pumped out and shipped to the Idaho Chemical Processing Plant by tanker truck. Spills during tank operation and runoff from an adjacent cask storage pad reportedly contaminated surface soils surrounding the tank. In 1968, a large quantity of oil was discovered in Tank V-2, and the tank was taken out of service. The oil was removed from Tank V-2 in 1981, and the liquid in the three tanks (V-1, V-2, and V-3) was removed in 1982. During removal of the liquid, approximately 6,434.5 L (1,700 gal) were accidentally allowed to drain onto the ground. The liquid puddled in a soil depression along the west side of the tank manways and flowed north out of the radiologically controlled area through a shallow ditch. Cleanup operations removed approximately 3.8 m^3 (128 ft^3) of radioactive soil in a 0.9-m^2 (10-ft^2) area north of the tanks and outside the posted RadCon zone, and the excavation was backfilled with clean soil. The tanks have not been used since the 1980s, although liquids (i.e., rainwater and snowmelt) have accidentally accumulated in Tank V-3 since the 1980s (DOE-ID 1997).

INEEL Drawing 107625, issued November 17, 1956, "Piping and Drainage Actuator Building Plot Plan" (see Figure 2-5 for excerpt of drawing), identifies and describes the above ditch before the addition of the TAN-615 north high bay in the 1970s. The ditch was relocated further plant north than as shown in Figure 2.5; however, this drawing was selected because there were no other drawings available that depicted the ditch. As shown in Figure 2-5, the ditch ran plant east between buildings TAN-616 and TAN-615. At the end of building TAN-615, the ditch ran plant north to the end of the building, then plant west along the building, then plant south along the building (approximately 1/3 the length of the building) and finally plant west away from the building and into a culvert. The terrain above the V-Tanks and west of the TAN-633 (Hot Cell Area) sloped toward the ditch. At this time, it is unknown whether the above spill made its way all along the ditch and into the culvert.

2.1.3 Technical Support Facility-18, Tank V-9

The TSF contaminated tank (TSF-18) is situated in an open area east of TAN-616 and north of TAN-607, as shown on Figure 2-3. TSF-18 consists of one UST and a concrete sand filter (described in Section 2.1.4).

The tank at TSF-18, referred to as Tank V-9 (see Figure 2-6), is a 1,514-L (400-gal) stainless steel sump tank located approximately 2.1 m (7 ft) to 4.2 m (14 ft) below ground surface. Tank V-9 is a vertical, cylindrical tank with a conical shaped bottom. It has a 1.07 m (42 in.) diameter through the cylindrical portion for 1.7 m (5.5 ft) and then tapers down another 53.3 cm (21 in.) through the conical section. Tank V-9 is accessible by a 15.2-cm (6-in.) diameter riser that extends to the ground surface. Based on information obtained during the remedial investigation, the tank contains approximately 0.9 m (3 ft) of sludge, 0.9 m (3 ft) of liquid, and 0.3 m (1 ft) of headspace. Blackmore (1998) estimated that the total volume of material in Tank V-9 was 1,216 L (320 gal). Radiation readings in the tank range from 9 mrem/hr on contact just inside the 15.2-cm (6-in.) riser to 10,500 mrem/hr just inside the tank. The tank was installed in the early 1950s and was indicated as a sump tank in facility "as-built" drawings. The visual evidence collected during the remedial investigation is consistent with the tank configuration shown in earlier "as-built" drawings (DOE-ID 1997). The internal visual evidence obtained with a remote camera during the remedial investigation also indicates that the tank is in good condition (DOE-ID 1997).

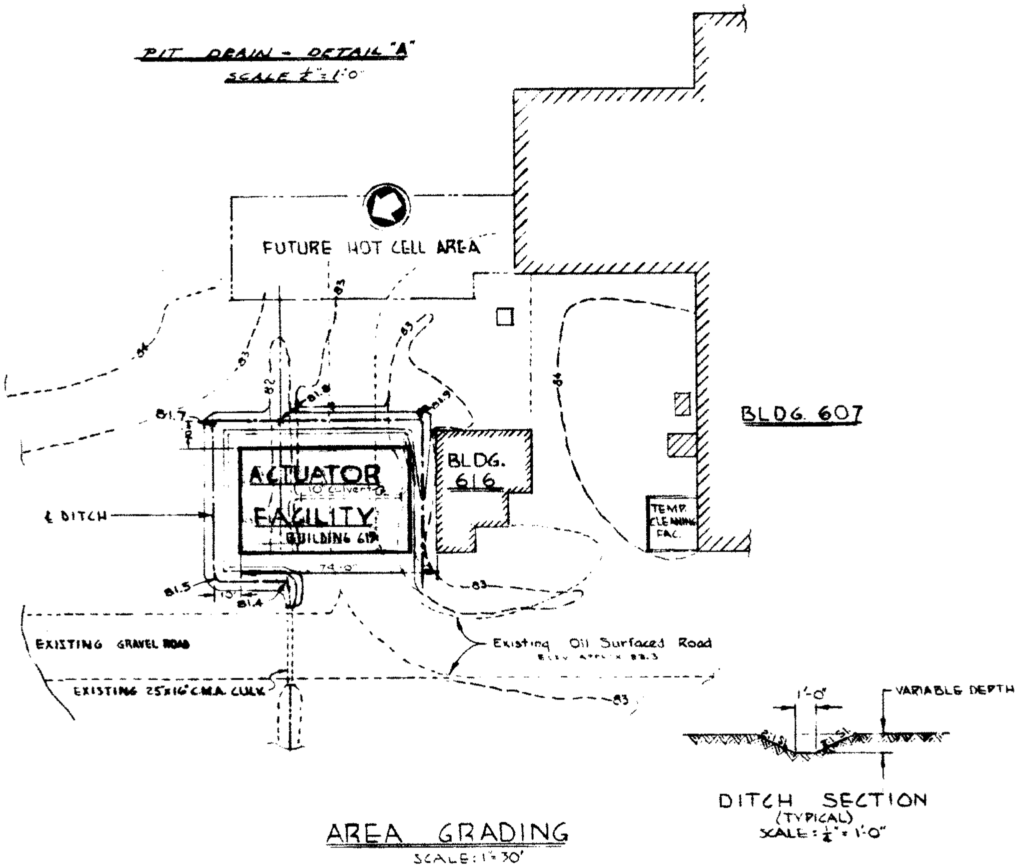

Figure 2-5. Drainage ditch and contours (excerpt from INEEL Drawing 107625).

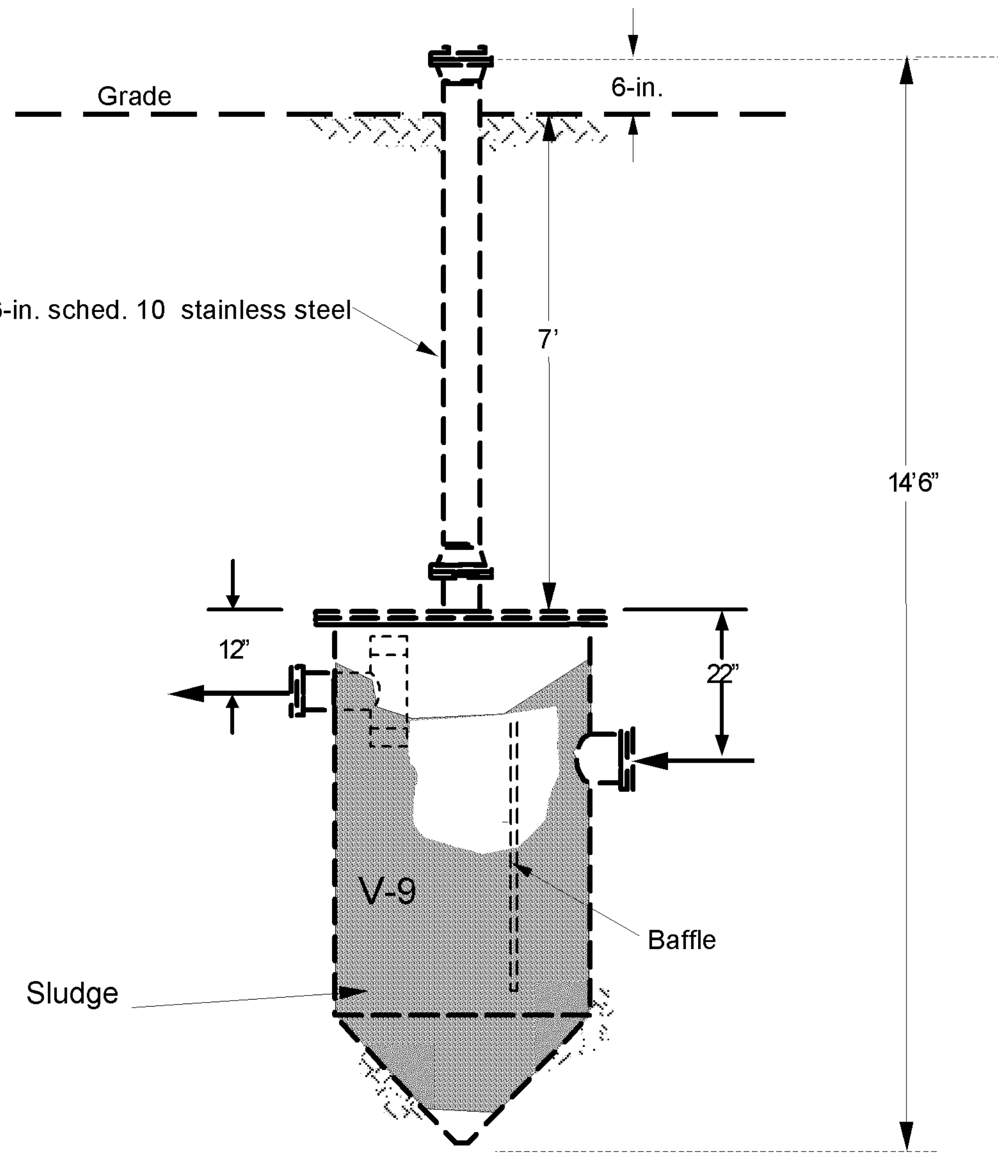

Figure 2-6. Diagram of Tank V-9.

Results from sampling and analysis of Tank V-9 contents performed during the remedial investigation indicate that chemicals in the tank are very similar to those found in the tanks at TSF-09. High concentrations of Sr-90, Cs-137, Co-60, and trichloroethene detected during analysis are consistent with those found in the TSF-09 tanks during the Track 2 investigation in 1993. The Chemical Characterization report (DOE-ID 2002b, Appendix C) documents potential organic and inorganic contaminants for V-9. Table B-1 in Appendix B summarizes these potential contaminants in two separate phases within this tank.

2.1.4 Concrete Sand Filter

The concrete sand filter at TSF-18 is a concrete structure that is 1.5 m (5 ft) long × 1 m (3 ft) wide × 1 m (3 ft) high located aboveground approximately 0.6 m (2 ft) south of the Tank V-1 riser. Although the history and use of the sand filter are not well known, the structure is rumored to have been installed around 1970 and used for only one day before it clogged and was taken out of service. A removable lid allows access to the inside of the concrete sand filter. The sand filter was sampled in 1997 to characterize the contents. Based on this sampling event, the concrete sand filter was determined to contain less than 0.03 m3 (1 ft3) of material. The sampling strategy was to collect one grab sample from the center of the sand filter to analyze for total VOCs and toxicity characteristic leaching procedure (TCLP) VOCs. After collecting the grab sample, a composite sample was collected from each of the four corners of the sand filter and the center. The composite sample was analyzed for total metals, TCLP metals, TCLP herbicides, TCLP pesticides, total SVOCs, TCLP SVOCs, and radionuclides.

Analytical results from the March 1997 sand filter sampling showed Aroclor-1260 concentrations of 290 parts per million (ppm) and gross alpha and gross beta concentrations of 1.65 × 104 pCi/g and 3.73 × 105 pCi/g, respectively. The radioactivity is attributed primarily to Co-60 (3.62 × 104 pCi/g), Sr-90 (1.03 × 105 pCi/g), Tc-99 (1.29 × 103 pCi/g), Cs-137 (1.09 × 105 pCi/g), and U-234 (2.19 × 104 pCi/g). In addition, U-235 was detected at 6.61 × 102 pCi/g (DOE-ID 2002b). The contaminants and concentrations detected in the concrete sand filter are similar to those detected in the V-9 tank. A criticality evaluation performed for the sand filter documents that not enough U-235 is present to pose a criticality concern (INEEL 2000b). Data tables presenting the results from the sand filter sampling are located in Appendix H of the Remedial Design/Remedial Action (RD/RA) Work Plan (DOE-ID 2002b).

The Chemical Characterization report (DOE-ID 2002b, Appendix C) also documents potential organic and inorganic contaminants for the sand filter, which are summarized in Table B-2 in Appendix B.

2.1.5 Technical Support Facility-21, Initial Engine Test Valve Pit

The Initial Engine Test (IET) valve pit was originally part of the Aircraft Nuclear Propulsion (ANP) Liquid Waste Treatment Plant system designed by Ralph M. Parsons and built during the 1950s. During its initial operation, the TSF-21 valve pit was referred to as the Contaminated Waste Line Valve Pit. Phillips Petroleum Company, Atomic Energy Division, modified the valve pit several times during the 1960s when the system was considered part of the TAN-616 TSF Radioactive Liquid Waste Evaporator System. During the 1970s, the system was again modified several times and generally referred to as the TAN Intermediate-Level Radioactive Liquid Waste Disposal System.

In accordance with the TSF-21 Track 2 Scoping Document, and the Initial Engine Test TSF-21 Valve Pit and Water from Concrete Coring of the Pit Hazardous Waste Determination Record, the valve pit was integral to the system from 1958 until 1979 when the valve pit ceased operation. The valve pit contents were removed and the piping systems were blind-flanged off on the inside as part of the September–November 1993 CERCLA investigation. The valve pit was excavated in November 1993, moved to TAN-647, and then sent for disposal to Envirocare of Utah in the fall of 2002. The IET valve pit was a concrete underground structure that contained valves and pipes as follows:

- 4 in. pipe manifold, which connects two 2 in. plugged spare pipe lines
- One 2 in. stainless steel pipeline from the IET facility
- One 2 in. stainless steel pipeline from the decon room in TAN-607
- One 4 in. stainless steel pipeline, which originally went to valve pit #1 east of TAN-616
- One 2 in. valve, which could drain the pipe manifold into the valve pit
- One 3 in. stainless steel pipeline, which was plugged and originally went to J-3 in V-9.

The valve pit was located approximately 40 ft northeast of the TAN-615 building, and the valves were operated from above the valve pit using the valve "T" handles. The outside dimensions of the IET valve pit are as follows:

- Length = 7 ft 4 in.
- Width = 6 ft 4 in.
- Height = 7 ft 6 in.
- Mud Sump = 12 × 12 × 12 in.

This equates to a total volume of 349 ft^3 (2,611 gal) (see Figure 2-7) (McAnally 1992 and HWDR 1997a).

In the Track 2, it was also documented that "during the 1987 removal activities of the 6,100 feet of 2 in. stainless steel pipe that connected the IET Hot Waste Tank to the valve pit, excess liquid in the pipe line was accidentally drained into the valve pit. The volume of material was so great that the valve pit was overfilled and radioactive liquid was reported to have overflowed onto the ground" (McAnally 1992).

The Track 2 document continued to state that there was circumstantial evidence that contaminants may have migrated from TSF-21 valve pit. The valve pit was enclosed with a manhole cover access. The inside of the pit was a radiation zone containing Cs-137, Co-60, Sr-90, and U-235. The pit had a 12 × 12 × 12 in. mud sump built into its bottom. It was assumed that the pit had been breached by numerous cracks and holes observed on the inside of the pit. Approximately 18 in. of liquid remained inside (≈525 gal) and above the mud sump (McAnally 1992). According to Jerry Burtenshaw[b], it was assumed that the mud sump had a large hole in it, and that the sludge collected there was temporarily holding the 18 in. of liquid in the pit. However, a watermark line was visible at 1 ft below the manhole cover. Further evidence of migration was seen when spring thaw occurred; i.e., the volume of liquid in the valve pit increased with the melting of the seasonal ice. Since the liquid level was holding at the 18 in. depth, and since the valve pit was closed by a manhole cover, evaporation of liquid to explain the difference in water line mark and liquid level seemed remote. There had been no known pumping of the valve pit, although liquid levels within the pit varied by season. Therefore, circumstantial evidence suggested that water entered and exited seasonally as noted by the liquid level changes and watermarks inside TSF-21.

The Hazardous Waste Determination Record (HWDR 1997a) further stated that the piping in the TSF-21 valve pit was part of the intermediate-level radioactive waste disposal system, and the valve pit became contaminated from leaks during approximately 30 years of operation. Several processes generated wastewater entering this valve pit, but no documentation is available tying contamination to specific leaks or to specific sources. Possible waste stream properties can be identified through investigation of the source facility processes. The descriptions that follow are based largely on personnel interviews documented in the *Historical Perspective of Solvent Usage at TAN,* WM-ERP-91-008, internal technical report (Medina 1992).

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b. Private communication with Jerry Burtenshaw, an eyewitness account and history of the TSF-21 IET Valve Pit, the surrounding ground area, and waste processes, August 13, 1992.

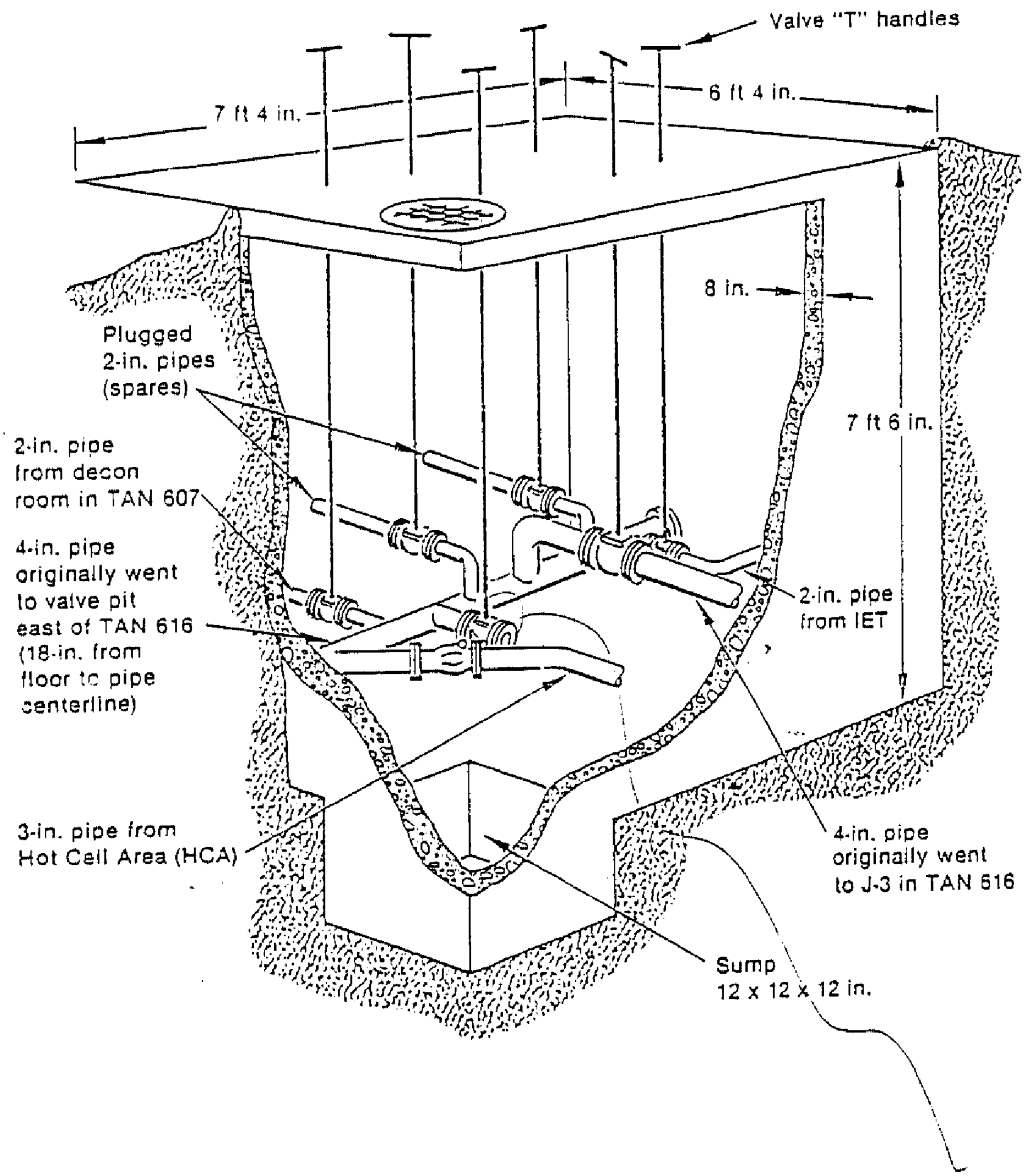

Figure 2-7. Diagram of TSF-21.

2.1.5.1 Initial Engine Test Hot Waste Tank (TAN-319, IET-07). The hot waste tank is a 15,000-gal tank (wastewater tank, IET-07) located at the IET. This tank received radioactive liquid waste from the concrete test pad west of building TAN-620 where reactor/engine tests were performed. The tank was last used in the early 1960s and was removed in 1985. The wastewater removed from the valve pit contained cesium-137, cobalt-60, strontium-90, and low concentrations of uranium-235. Metals were identified as contaminants of concern but were not targeted for analysis. During the TSF-21 valve pit removal activities, mercury was found in the pipe leading from the concrete test pad to the hot waste tank.

2.1.5.2 TAN-633 Hot Cell Annex. The Hot Cell Annex within TAN-633 was used to handle and examine radioactive materials remotely. Small quantities of decontamination solutions and metal etching solutions may have been generated by these activities, but specific information is not available for this waste.

2.1.5.3 TAN-607 Decon Room. The TAN-607 Decontamination Room is located in the southwest corner of TAN-607 and was connected to the IET valve pit through a 2-in. waste line which ran west of TAN-666. The decontamination room contained tanks of corrosive cleaning solutions used to remove loose contamination from piping and other metal components (including Turco products, nitric acid, sulfuric acid, hydrofluoric acid, and alkaline-based solutions). Use of these solutions would generate wastewater containing metals such as lead, mercury, and chromium. Trichloroethene (TCE), methyl chloroform, and Stoddard solvent also were used and discharged to drains connected to the IET valve pit.

2.1.5.4 Polychlorinated Biphenyls Contamination. In the early 1980s, PCBs were released into the intermediate-level radioactive waste disposal system downstream of TSF-21. The suspected main source of PCBs was a ruptured hydraulic fluid line from equipment within the TAN-607 Hot Shop. This contamination did not enter the IET valve pit but, given the pervasive PCB contamination in TAN wastewater, the TSF-21 valve pit was analyzed for PCBs. The highest concentration of PCBs detected in sludge was 32.7 mg/kg; the highest concentration detected in the liquid was 0.034 mg/L; and the highest concentration detected in the concrete of the pit itself was 0.59 mg/kg.

2.2 Previous Soil Investigations–V-Tanks

2.2.1 Preliminary Soil Investigations

A survey of the soil in the tank area was performed in 1980 and 1983, and composite soil samples were taken from six trenches within the area (Sneed 1983). The survey area included a 15 × 24 m (50 × 80 ft) surface area above the tanks. This area was staked off in 3 × 3 m (10 × 10 ft) grid originating in the southeasternmost corner, as shown in Figure 2-8.

The surface survey was performed with a shielded pancake GM probe (Eberline HP 210) and a digital ratemeter (Eberline PRS-1 [“Rascal”]). The survey was performed by walking back and forth in each of the squares in an east-west direction, then in a north-south direction, with the probe 6 in. from the ground.

Six trenches were sampled in this effort as well. Trench locations were selected based on the results of surface radiation surveys. Three grid locations were selected based on the presence of high surface radiation levels (grid squares 22, 38, and 37) and three were selected based on the presence of low surface radiation levels (grid squares 15, 24, and 34). Trenches were dug to 1.5 m (5 ft) long × 0.9 m (3 ft) wide × 36 in. deep. Samples were collected at 6-in. intervals starting at the surface. A composite of three samples was collected at each interval: one from each side and one from the middle. The samples were then analyzed at the TRA radiological measurements laboratory (RML) for gamma emitters. Survey results of both the surface samples and the trench samples are presented in Tables H-34 and H-35 of Appendix H of the RD/RA work plan (DOE-ID 2002b). Results exhibited high concentrations of Cs-137 and Co-60 in all surface samples. In all cases, the concentrations at 91.4 cm (36 in.) were elevated above background activities (EG&G internal technical report 1983).

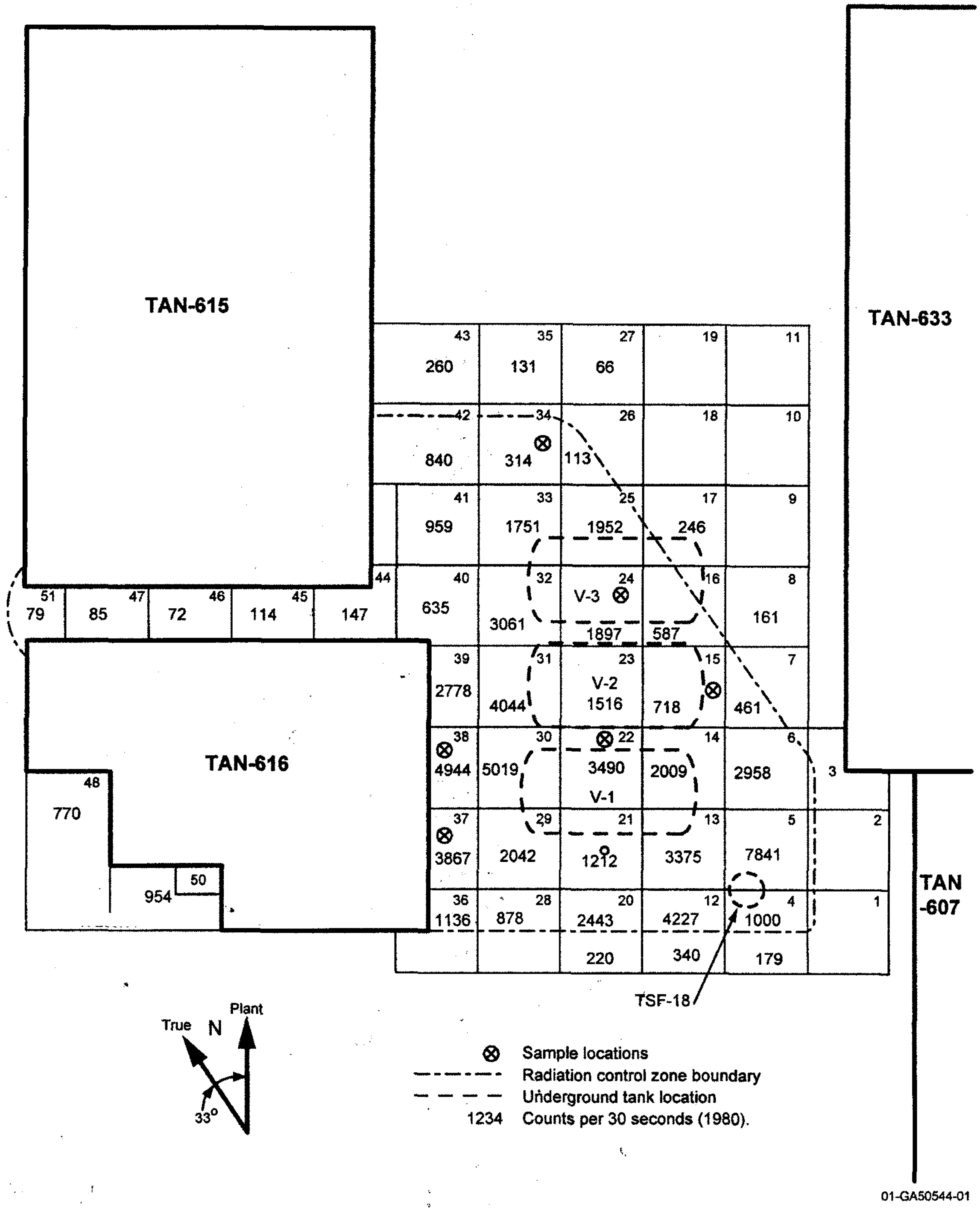

Figure 2-8. 1983 Grid network for surface soil radiological surveys and trench sampling locations.

Soil samples were also collected in three locations within the tanks area in 1988. The purpose of the sampling was to provide additional site-specific data as a part of the DOE Environmental Survey. The soil samples were collected with split barrel samplers and did not go beyond a depth of 2 ft. Two of the borings were located west of the V-Tanks, and the other was located north of the V-Tanks (INEEL 1994). While the results of the 1988 DOE Environmental Survey were unpublished, the results were reviewed to evaluate the TSF-09/18 area. The sampling results of the soil borings indicated that soil surrounding the V-Tanks showed elevated levels of beta/gamma activity (>.5mR/hr) (INEEL 1994).

2.2.2 1993 Track 2 Soil Sampling

The 1993 Track 2 investigation included the collection of eight samples from three boreholes known as Locations A, B, and C. Location A was just south of the valve pit next to TSF-18; Location B was just off the southwest corner of Tank V-2; and Location C was in the drainage ditch north of Tank V-3 (see Figure 2-9).

The soil at Location A was sampled at the surface from 0 to 0.5 ft deep, the shallow subsurface from 0 to 4 ft deep, and the deep subsurface from 20 to 24 ft deep. The soil at Location B was sampled at the surface from 0 to 0.5 ft deep and the shallow subsurface from 5 to 8 ft deep. The soil at Location C was sampled at the surface from 0 to 0.5 ft deep, the shallow subsurface from 0 to 4.5 ft deep, and the deep subsurface from 18 to 22 ft deep. Table 2-1 presents the 1993 analytical results for Locations A, B, and C. Analytical results are also presented in Figure 2-9, which also shows the types and locations of samples collected (surface, shallow, or deep boring).

Results of the 1993 Track 2 investigation show that surface soil contamination ranged from 16 to 18 pCi/g gross alpha and 76 to 1,100 pCi/g gross beta. Subsurface measurements of gross alpha ranged from 9.2 to 26.0 pCi/g and gross beta ranged from 47 to 160 pCi/g. Cobalt-60 and cesium-137 were detected in the subsurface with maximum concentrations of 0.3 pCi/g and 103 pCi/g, respectively. The results of the inorganic analyses of samples from various intervals in the boreholes did not indicate elevated concentrations of metals at any of the depth locations. Analyses of VOCs and SVOCs show very low concentrations of acetone, trichloroethene, and Aroclor-1254.

2.2.3 1998 Soil Sampling

The soils surrounding the tanks were resampled in 1998. A FSP (DOE-ID 1998) was prepared to direct the collection and analysis of soil samples from various WAG 1 sites, including TSF-09 and TSF-18 (see Figure 2-10 for sampling locations). The objectives of the soil sampling included:

- Providing specific VOC data for identified contaminants of concern to be used as the basis to support a no-longer-contained-in determination

- Providing specific PCB data for identified contaminants of concern to be used to further support as-found concentrations of PCBs in soil

- Providing specific TCLP metals data to be used to support the statement that the soils do not contain TCLP metals at levels regulated under RCRA.

Assuming a 95% confidence upper bound level, it was determined that 12 samples would reasonably achieve the desired confidence level of 90%. Available historical data show low concentrations (approaching the method detection limits). Four borehole locations were randomly chosen from a 10- × 10-ft grid. Three samples collected from discrete depth intervals were collected from each borehole. Shallow surface samples were collected at depths of 1–3 ft, 5–7 ft, and 8–10 ft. Subsurface samples were collected at depths of 10–12 ft, 14–16 ft, and 18–20 ft.

Table 2-1. 1993 Track 2 soil sampling summary.

	Location A (~5 ft south of Tank V-9)	Location B (~5 ft west of Tank V-2)	Location C (~5 ft west of Tank V-1)
Surface Soil	(0 ft to 0.5 ft)	(0 ft to 0.5 ft)	(0 ft to 0.5 ft)
Gross alpha	18 pCi/g	16 pCi/g	16 pCi/g
Gross beta	210 pCi/g	1,100 pCi/g	76 pCi/g
Shallow Subsurface Soil	(0 ft to 4 ft)	(5 ft to 8 ft)	(0 ft to 4.5 ft)
Gross alpha	9.2 pCi/g	26 pCi/g	11 pCi/g
Gross beta	47 pCi/g	160 pCi/g	20 pCi/g
Co-60	0.24 pCi/g	0.13 pCi/g	
Cs-137	1.19 pCi/g	103 pCi/g	0.06 pCi/g
Barium	124 mg/kg	99.6 mg/kg	201 mg/kg
Cadmium	1.3 mg/kg	1.2 mg/kg	2.3 mg/kg
Chromium	21 mg/kg	14.2 mg/kg	25.5 mg/kg
Lead	17.3 mg/kg	26.7 mg/kg	23.5 mg/kg
Aroclor-1254	—	—	1.08 mg/kg
Deep Subsurface Soil	(20 ft to 24 ft)	(None)	(18 ft to 24 ft)
Gross alpha	4.9 pCi/g	—	12 pCi/g
Gross beta	20 pCi/g	—	49 pCi/g
Co-60	—	—	0.3 pCi/g
Cs-137	—	—	22.1 pCi/g
Barium	236 mg/kg	—	253 mg/kg
Cadmium	2.4 mg/kg	—	2.7 mg/kg
Chromium	32.2 mg/kg	—	31.7 mg/kg
Lead	27.9 mg/kg	—	17.9 mg/kg
Acetone	0.04 mg/kg	—	—
Trichloroethene	0.009 mg/kg	—	0.003 mg/kg

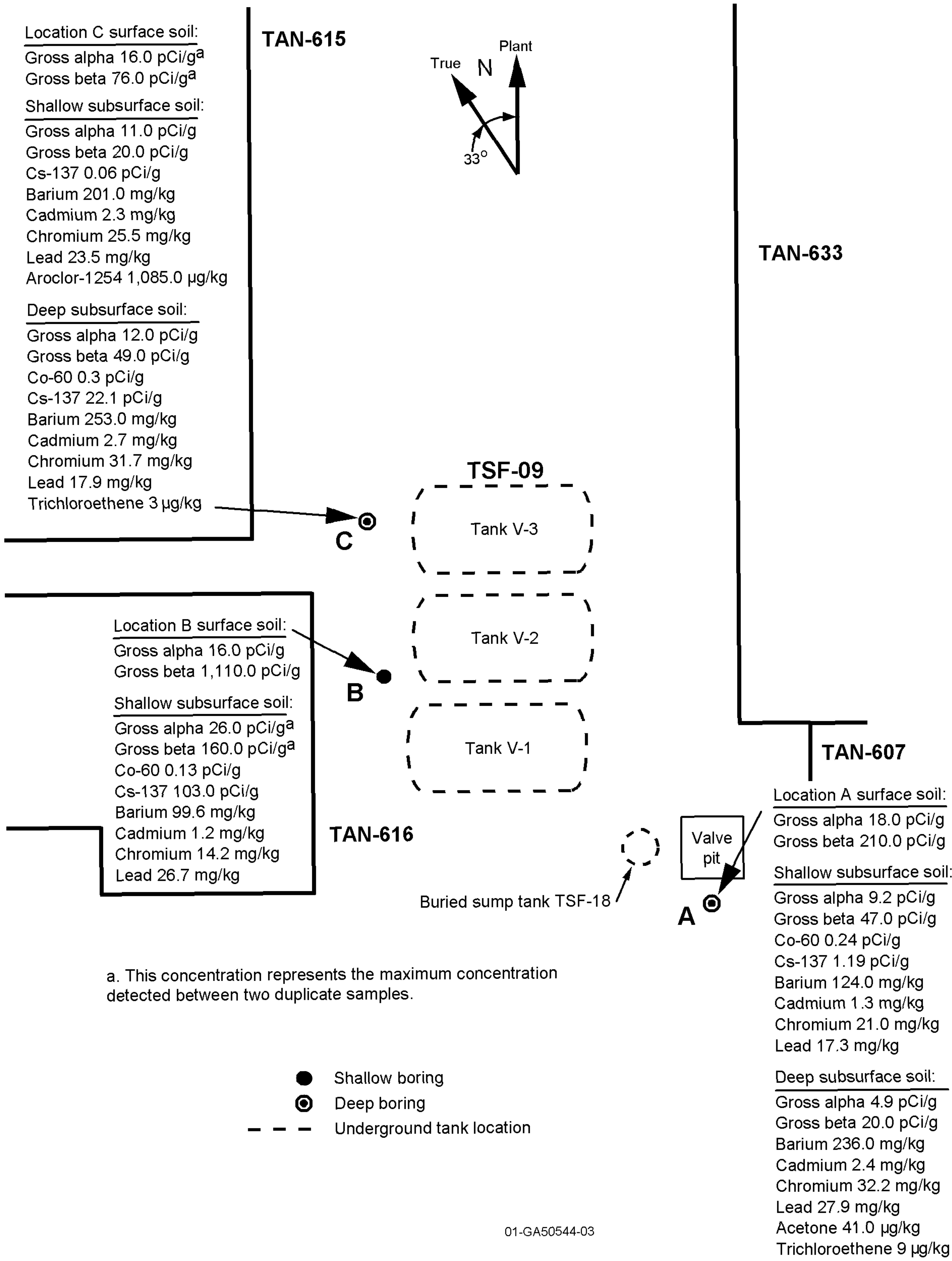

Figure 2-9. 1993 Phase II Track 2 soil sampling analytical results from V-Tanks area.

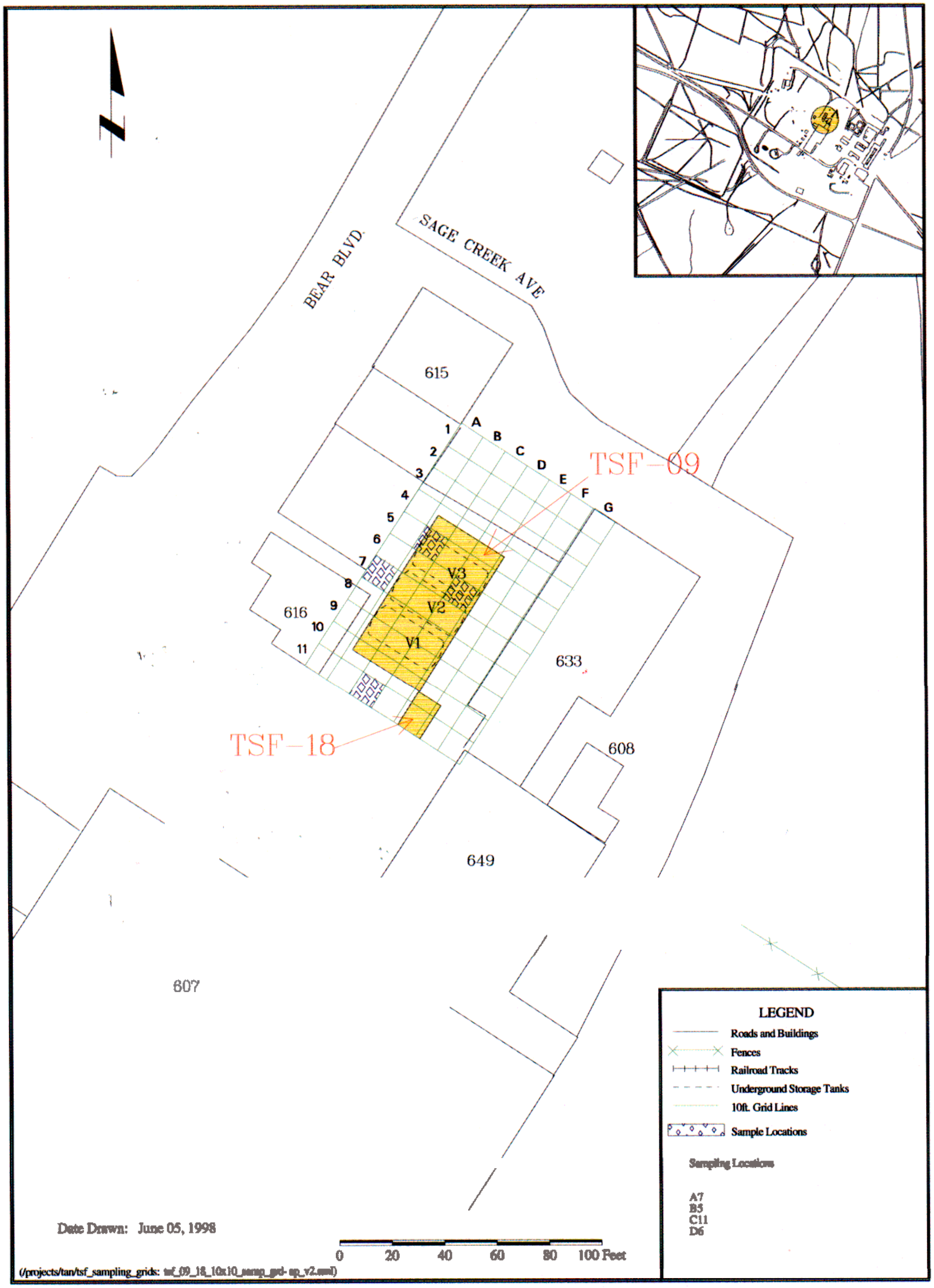

Figure 2-10. 1998 Soil sampling locations.

NOTE: *V-Tank locations are not accurately represented.*

Analysis of the soil samples TCLP VOCs showed nondetect for all analytes. PCB analyses were also nondetect for all samples. TCLP metal analyses were qualified as nondetect or estimated. All values are below the RCRA-regulated TCLP and land disposal restriction (LDR) concentrations. A letter from the DOE (Hain 1998), dated November 3, 1998, in reference to the surface soil sampling, stated that the WAG 1 tanks site TCLP VOCs, TCLP metals and PCBs were nondetect.

2.3 Previous Soil Investigations–TSF-21 Valve Pit

2.3.1 1993 Track 2

The 1993 Track 2 Scoping Document for the TSF-21 valve pit does not go into great detail regarding the soil contamination around the pit. It basically states that the surface soils around the TSF-21 valve pit are known to have the contaminants cesium-137, cobalt-60, strontium-90, and uranium-235, and that clean soils have been placed over the contaminated soils from the IET pipe removal spill. The Track 2 document also estimates that the worst-case scenario for soil contamination under TSF-21 would be 3,894 ft^3 ($12 \times 11 \times 29.5$ ft deep).

2.3.2 1997 Hazardous Waste Determination Record

The Hazardous Waste Determination Record for the IET TSF-21 valve pit removal soils (HWDR 1997b) documents the characterization of the contaminated soil produced during the excavation of the IET valve pit in 1993. The soil surrounding the valve pit was removed and containerized in four $\times$ 4 $\times$ 8 ft waste boxes (512 ft^3) as part of the September 1993 CERCLA investigation. The soil was contaminated by a leak during the CERCLA investigation, but other leaks over the 30 years of valve pit operation also may have contributed to the contamination.

The containerized soil was sampled in July/August 1996, as described in the Limited Scope and Hazard Task Plan for Operable Unit (OU) 1-10 Waste. Samples were analyzed by a Utah RCRA certified laboratory for PCBs, TCLP volatiles, TCLP metals and gamma spectroscopy. On March 3, 1997, additional samples were collected from the four boxes containing soil, as described in the February 24, 1997, Document Action Request number ER-DAR-509, *Sampling of the TSF-21 Valve Pit and Soil*. These samples were also analyzed by a Utah certified laboratory for total volatiles, PCBs, radionuclides, and metals.

The HWDR did not classify TSF-21 soil as a RCRA characteristic waste. All metals, volatile organic compounds, semivolatile organic compounds in the soil were less than the regulatory thresholds. However, waste from the TSF-21 valve pit spilled/leaked into the soils during the CERCLA investigation and during 30 years of operation. This waste included a F001 degreasing solvent (i.e., TCE), and the soil became subject to regulation as a RCRA F001 listed waste under 40 CFR 261.33(d).

The source of PCBs in the waste that contaminated the soil is unknown and unknowable. Therefore, the soil was managed on the basis of its PCB concentration. The maximum concentration of PCBs detected in the sludge/liquids of the valve pit was 32.7 mg/kg, and the maximum concentration in the soils themselves was 31 ug/kg. Both values are below the 50 mg/kg Toxic Substances Control Act (TSCA) limit, and the soil was not subject to TSCA regulation.

The radionuclide data for the containerized soils is provided in Table 2-2. The information was obtained for INEEL's Integrated Waste Tracking System (IWTS) as of February 24, 2003. The containers listed in Table 2-2 are currently stored at the Idaho Nuclear Technology and Engineering Center (INTEC) Building CPP-1617 and are slated to be disposed of at the INEEL CERCLA Disposal Facility (ICDF) Complex.

Table 2-2. Integrated Waste Tracking System container profile radionuclide worksheet data.

IWTS Container Profile # Radionuclides	15067K Ci	15068K Ci	15069K Ci	15070K Ci
Ag-108	6.04E-7	6.54E-7	6.65E-7	6.16E-7
Ag-108m	4.38E-6	4.74E-6	4.82E-6	4.47E-6
Ag-110m	2.49E-3	2.69E-3	2.73E-3	2.53E-3
Ba-137m	5.97E-2	6.46E-2	6.56E-2	6.08E-2
Co-58	8.08E-6	8.74E-6	8.89E-6	8.24E-6
Co-60	5.67E-4	6.13E-4	6.23E-4	5.78E-4
Cs-134	4.95E-7	5.35E-7	5.44E-7	5.04E-7
Cs-137	5.97E-2	6.46E-2	6.56E-2	6.08E-2
Eu-152	1.04E-5	1.12E-5	1.14E-5	1.06E-5
Eu-154	1.51E-6	1.63E-6	1.66E-6	1.54E-6
Eu-155	9.74E-7	1.05E-6	1.07E-6	9.93E-7
Nb-95	1.98E-7	2.14E-7	2.17E-7	2.01E-7
Pa-234m	5.1E-6	5.52E-6	5.61E-6	5.2E-6
Sr-90	5.67E-3	6.13E-3	6.23E-3	5.78E-3
Th-234	5.1E-6	5.52E-6	5.61E-6	5.2E-6
U-234	1.26E-6	1.36E-5	1.38E-5	1.28E-5
U-238	5.1E-6	5.52E-6	5.61E-6	5.2E-6

2.4 Review of Sampling Events

Reviewing all of the above sampling events in and around the V-Tank sites indicates several data gaps. These data gaps are summarized below:

1. Ditch that surrounded TAN-615 – There is lack of sampling and analytical information to determine whether spills to the ditch were adequately remediated along the ditch and into the culvert.

2. TSF-21 – There is lack of sampling and analytical information to determine whether spills from the valve pit were adequately remediated radially and vertically.

3. TSF-09/18 – There is lack of sampling and analytical data to determine whether there is contamination below the V-Tank sites[c] (i.e., below 24 ft to basalt).

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c. The "Field Sampling Plan for the HWMA/RCRA Closure of the TAN-616 Liquid Waste Treatment Facility" (INEEL 2003b) will also conduct sampling and analytical activities along some of the pipe runs and structures in the V-Tank sites. Therefore, this FSP does not intend to duplicate that effort.

4. Pipe runs – There is lack of sampling and analytical data to determine whether there is contamination below or adjacent to pipe runs from past pipe leaks[c], if any.

5. North and northwest of the V-Tanks, and radially from TSF-21 – There is lack of sampling and analytical data to determine whether there is windblown contamination from these source areas.

6. Cask Storage Area – There is a lack of sampling and analytical data to determine whether there is contamination due to run-off from the cask storage pad.